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ABSTRACT

A report recently released by the National Council for Accreditation of Teacher Education (NCATE) promotes the use of technology in colleges of education. To respond to the professional call, several teacher education programs have been offering computer courses to help the future teachers. This research examined one of the computer courses, an introductory computer literacy course commonly offered at colleges of education. The research focused on four universities which offer a similar course: Arizona State University (ASU), Indiana University (IU), Pennsylvania State University (PSU), and University of Virginia (UV). Two structures were found to be employed for the course. At ASU, the course content contains lecture and lab; concepts instruction is conducted in a big hall with about 100 students and lab is conducted in small groups in a computer lab. Instructors use identical syllabi so that students are guaranteed to be taught the same information. At IU, there is no separation into lecture and lab sections; the course is conducted in a computer lab where instructors teach both concepts and skills using similar syllabi to about 500 students. The course content contains concepts and skills that include knowledge of computer technology and design, such as basics of hardware and presentation design and skills such as word processing, spreadsheet, database, e-mail, and webpage development. Students at IU, PSU, and UV learn multimedia and presentation applications as well; students at ASU learn fewer applications but spend more time on each. There are advantages and disadvantages to both structures. An institute should choose a structure which fits the institute and keeps the course consistent. (AEF)

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A Computer Literacy Course at Colleges of Education: What and How

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Abstract: A report recently released by the National Council for Accreditation of Teacher Education (NCATE) promotes the use of technology in colleges of education. In order to provide the best instruction on technology use, it is important to examine the design of introductory computer literacy courses at colleges of education. The purpose of the study is to investigate the course design, including structure and content. Implications for a good course design are provided.

Overview

Technologies of the 20th century have changed how we live, how we conduct business, and how we communicate with each other. Of course, it also affects the way we teach and the way we learn.

The business world demands schools to prepare the students for effective use of technology in their future work places. The president and vice president of the United States expect every child in our nation to feel comfortable on the Information Super Highway. In addition, computer-to-student ratios have dropped consistently from 1:50 in 1985 to 1:20 in 1990 to an estimated 1:9 in 1997 (National Council for Accreditation of Teacher Education [NCATE], 1997). All of these facts indicate that new technology is affecting our classroom practice and also the culture of the schools. The technological influence is challenging our teachers and will challenge the two million new teachers who will be hired over the next decade. The new teachers should feel comfortable with the new culture of the schools and be ready for the requirements of teaching in the "Information Age." Are our teacher education programs preparing the two million new teachers to face the challenges? Unfortunately, most programs "have a long way to go" (NCATE, 1997, p. 1).

The NCATE task force assists colleges of education by summarizing the technology skills and knowledge which a new professional teacher needs to acquire during the preservice training: new understandings, new approaches, new roles, and new attitudes (NCATE, 1997). The teachers need to understand the deep impact of technology on the nature of work, on communication, and on the development of knowledge. They must use a wide range of technological tools and software as part of their own instruction. They must help students in the use of technology to gain information which goes beyond textbooks and teachers. In addition, they should be fearless in the use of technology and be life-long learners.

To respond to the professional call, several teacher education programs have been offering computer courses to help the future teachers. The following research focused on one of the computer courses, an introductory computer literacy course, which is commonly offered at colleges of education. The study reports how the course is taught and what is taught in the course at different universities.

The Research Study

The study was designed to investigate the structure and content of the introductory computer literacy course at colleges of education at universities in the United States. The structure and content of the course were examined.

Research Problem

Due to the need for the new professional teachers, colleges across the nation become equipped with technological tools. Programs preparing teachers to utilize these devices for enhanced learning still need to be developed and adjusted. Many universities help their students take advantage of these new tools by offering introductory computer literacy courses. Unfortunately, there has been little discussion on what skills and knowledge teachers must have to take advantage of the new technological tools (Old Dominion University, 1997).

Research Questions

1. What structure is used for the course?
2. What skills are students required to master in the course?
3. What knowledge do students need to acquire in the course?

Procedures and Methods

Nine universities were selected for the study: Arizona State University, Florida State University, Harvard University, Indiana University, Massachusetts Institute of Technology, Pennsylvania State University, Stanford University, University of Virginia, and Yale University. These universities either are considered to be prestigious universities or have the reputation of offering an outstanding educational technology program.

First, phone calls were made to each university to find a course which prepares undergraduate education students on using technology for their future teaching career. During the same time, copies of the course webpages were obtained.

The initial phone interviews and webpage search revealed that each university has its own way of preparing their students for the use of technology in instruction. Some universities do not have education programs for undergraduate students, such as Stanford University. Stanford University does offer a course entitled Information Technology in the Classroom (Education 224), which is designed to give teachers in the Stanford Teacher Education Program (STEP) a foundation for using technology in their teaching (Stanford University, 1997). However, the course is not considered to be an introductory course because students in the class are expected to already know some computer applications, such as word processing and e-mail. Some other universities do not offer independent education technology courses; instead they integrate technology into other education courses, such as method or foundation courses. Yale University is an example of these universities.

Therefore, the research focused on four of the universities which offer a similar introductory computer course: Arizona State University (ASU), Indiana University (IU), Pennsylvania State University (PSU), and University of Virginia (UV). "EMC 321: Computer Literacy" offered at ASU, "W200: Microcomputers in Education" offered at IU, "INSYS 400: Introduction to Instructional Technology for Educators" offered at PSU, and "EDLF 345: Introduction to Computers & Media in Teaching" offered at UV were selected for the research. Phone call interviews were conducted to obtain detailed information on this specific course at each university and the course webpages were downloaded for analysis.

The data collection and analysis focused on structure and content of the courses. How the course is taught and what is taught at each university were categorized and analyzed.

Results

The four introductory computer courses selected for the research are similar to each other. However, the structure and content of the courses still vary from one university to another.

Structure: The introductory computer course is a required course for students at the College of Education at ASU and IU, but is not required for students at PSU and UV. At PSU, several computer courses are offered to undergraduate education students, and they may choose any course. According to the professor who was interviewed, it is not necessary to require this specific course because other courses are also available. In addition, the course at PSU can be a one-credit, two-credit, or three-credit course depending on the interest of the individual student. Similar to PSU, several computer courses are offered to undergraduate education students at ASU. In contrast to PSU, the course is required at ASU.

At ASU, the course contains lecture and lab. The lecture is conducted in a big lecture hall which can accommodate more than 150 students. Students learn the concepts with approximately 100 other students in the big lecture hall. The lab is conducted in small groups in a computer lab with approximately 25 computers. Students have hands-on experience in the computer lab. Students have two instructors, one for the lecture and one for the lab. The lecture syllabus and the lab syllabus match each other. The course instructors use identical syllabi and conduct weekly meetings to maintain consistency of the course. Students take identical mid-term and final examinations. With two or three lectures, this structure allows the same course content to be taught to more than 300 students simultaneously.

At IU, the course is structured differently. There is no separation into lecture and lab sections. The course is conducted in a computer lab where the instructors teach both computer concepts and skills. The course instructors use similar syllabi. However, since many instructors are teaching the class and since about 500 students are taking the course, an instructor of the course addressed in a phone interview that the course

content might slightly vary because each individual instructor might emphasize different concepts or skills.

Content: The course contains concepts and skills at all four of the universities. Concepts include knowledge of computer technology and design, such as basics of hardware and presentation design. The students are expected to master skills such as word processing and database. ClarisWorks and MSWorks are commonly used for word processing, spreadsheet, and database. PowerPoint is frequently employed for presentation and HyperStudio for multimedia. Word, Excel, and FileMaker Pro are used by IU.

Students at all four universities learn concepts and skills of work processing, spreadsheet, database, e-mail, and webpage development. In addition to these skills, students at IU, PSU, and UV learn multimedia and presentation applications. Instructors at PSU help students integrate technology into instruction by teaching them how to write a lesson plan. Instructors at UV encourage students to participate in outside activities by giving them field assignments.

Compared to students at IU, PSU, and UV, students at ASU learn fewer applications in the course but spend more time on each application. Their course only emphasizes word processing, spreadsheet, database, and webpage development. Since other computer courses are available at the College of Education at ASU, the students are encouraged to learn additional computer skills from the other computer courses.

Table 1 lists main concepts and skills the course involves in each university. As mentioned earlier, an instructor at IU might focus on some skills which might not be emphasized by another instructor who teaches the same course. The course at PSU can be a one-credit, two-credit, or three-credit course. A student, who takes the course as a one-credit course, spends less time and learns fewer computer applications than a student, who takes it as a three-credit course. For example, multimedia and HyperStudio are not taught to the former students, but only to the latter students. Therefore, a student might not learn all concepts and skills listed on the following table depending on his/er university structure and instructor.

Table 1. Concepts and Skills Involved in the Introductory Computer Course

	ASU	IU	UV	PSU
Concepts				
Word Processing	•	•	•	•
Spreadsheet	•	•	•	•
Database	•	•	•	•
Multimedia	•	•	•	•
Presentation & Visual Design	•	•	•	•
Lesson plan & Instructional Design		•	•	•
Netsearch	•	•	•	•
Software evaluation		•	•	•
Skills				
Word Processing	•	•	•	•
Spreadsheet	•	•	•	•
Database	•	•	•	•
E-mail	•	•	•	•
Multimedia		•	•	•
Presentation		•	•	•
HTML & Web Development	•	•	•	•

Note. ASU = Arizona State University, IU = Indiana University, PSU = Pennsylvania State University, UV = University of Virginia

Implications

Preparing education students (future teachers) to teach in the Information Age is necessary. The students must understand their new roles, use new approaches, and have new attitudes. Being able to use technology, especially computers, and to integrate them into instruction is essential. Every teacher education program has to prepare our students for the technological change in the society and also at schools.

A teacher education program has to either offer educational computer courses, like at ASU and IU, or courses with technological integration, like at Yale University. It is more demanding to offer courses with technological integration than to offer educational computer courses because the former requires more faculty members of the program to be skillful of technology. Currently many faculty members at colleges of education are still in a stage of learning the use of technology.

Before faculty is ready to teach courses integrating technology, the program must offer educational computer courses, especially introductory computer courses. If only one computer course is offered in a program, the course should be required for education students. If several courses are offered, students should select one or two of the courses to fulfill their program requirements.

Two structures were found to be employed for the course. The structure at ASU is organized, and the course content is very consistent. Students taking the course are guaranteed to be taught the same information. Since students learn computer concepts with about 100 students in a big lecture hall, they might learn less effectively compared to students in a learning environment with only 20 students. The structure at IU allows students to access a computer at any time in class; students might learn better in a small computer lab, rather than a big lecture hall. However, students might learn different information from different instructors even though they take the same course.

There are advantages and disadvantages to both structures. If all instructors of the course are willing to use identical syllabi and participate in regular meetings and if they are able to teach all concepts and skills listed on the syllabus, the IU structure is recommended to be used. If an instructor cannot meet the three requirements mentioned above, the ASU structure is helpful for maintaining the consistency of the course. In addition, the ASU structure allows graduate students with good computer skills to teach lab sections even thought they might not be qualified to lecture the course.

Regarding the course content, students can learn more software in a less sophisticated way or acquire fewer applications in a more profound way. An institute with only one computer course at its teacher education program is recommended to have the course include as much information as possible. In other words, students will be able to use word processing, spreadsheet, database, presentation software, multimedia application, e-mail, Netsearch, and develop a webpage at the end of course. Hopefully, the basics they learned in the course will allow them to later expand their experience with computers. If additional computer courses are offered, the introductory course may cover fewer applications, but in greater depth.

Conclusions

Technology development is affecting our schools. Teacher education programs are required to prepare students to understand their new roles, use new approaches, and have new attitudes for teaching in the Information Age. An introductory computer course similar to the courses offered at the four universities of this research study is strongly suggested to be offered to students at each college of education. Different structures are employed at the universities. An institute should choose a structure which fits the institute and keeps the course consistent. Surely, the course content may be affected by the course structure and institutional characteristics. The course content at the four universities provides the education students with the computer

concepts and skills which they are expected to know for their future teaching: word processing, spreadsheet, database, multimedia, presentation, e-mail, Netsearch, and integrating technology into instruction. An education student with these computer skills and knowledge will become a qualified teacher who can prepare the children in our nation to face the challenges of the modern world.

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